617. SCIENCE STANDARDS - GRADE 6, SECTIONS 618 THROUGH 628.

The samples associated with the content standards are meant to illustrate meaning and to represent possible areas of applications. They are not intended to be an exhaustive list, but are samples of applications that would demonstrate learning.

618. UNIFYING CONCEPTS OF SCIENCE.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand systems, order, and organization.	a. Know that a system is an organized group of related objects that form a whole.	i. Illustrate how different organisms interact with one another to create a desert ecosystem.
	b. Describe the function of each human body system.	
02. Understand concepts and processes of evidence, models, and explanation.	a. Know that observations and data are evidence on which to base scientific explanations and predictions.	i. Determine the speed of various wind-up toys and graph results. ii. Observe a pendulum and record data. Using this data, determine the variable that affects the period.
	b. Know the difference between observations and inferences.	i. Use happy/sad balls to determine the differences between observation and inference. ii. During a science experiment, discuss the difference between observation and inference.
	c. Use models to explain or demonstrate a concept.	i. Using gelatin, build a model of a cell. ii. Use block sets to investigate simple machines.
	d. Develop skills to create scientific explanations based on scientific knowledge, logic, and analysis.	i. Using the knowledge of levers, develop a plan to build a teeter-totter for the playground. Explain how two students of different weights would sit on a teeter-totter and balance it.
03. Understand constancy, change, and measurement.	a. Recognize that some concepts in science do not change with time.	i. Using marbles, demonstrate Newton's Laws of Motion.
	b. Analyze changes that occur in and among systems.	i. Graph the growth of a plant over time. ii. Given a specific body of water and location, research why water quality changes over time.
	c. Measure using standard and metric systems with an emphasis on the metric system.	i. Measure length, volume, mass, and temperature.

04. Understand the theory that evolution is a process that relates to the gradual changes in the universe and of equilibrium as a physical state.	a. Understand the relationships of past, present, and future.	i. Explain how soil is formed. ii. Give a presentation on the rock cycle.
05. Understand concepts of form and function.	a. Understand that the shape or form of an object or system is frequently related to its use or function.	i. Participate in an "Invention Convention" and design new products using recycled materials. ii. Analyze the different beaks of birds and explain how their adaptations help them. iii. Explain how the form of a human hand functions to pick up a tool. iv. Read and discuss The Elephant's Child by Rudyard Kipling.

619. CONCEPTS OF SCIENTIFIC INQUIRY.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand scientific inquiry and develop critical thinking skills.	a. Develop questions that can be answered by conducting scientific experiments.	i. What type of bridge would you build to test for maximum strength? ii. Given a regular soda and a diet soda, generate questions for investigations.
	b. Conduct scientific investigations using controls and variables when appropriate.	i. Design and build a bridge that will hold the maximum weight. ii. Conduct an experiment to test several brands of paper towels for absorbency.
	c. Select and use appropriate tools and techniques to gather and display data.	i. Graph class results using bridge data. ii. Use a calculator to determine averages of data.
	d. Analyze data in order to develop descriptions, explanations, predictions, and models using evidence.	i. Develop an explanation why one bridge held more weight than the other does.
	e. Develop a hypothesis based on observations.	i. Develop a plan for improving the bridge design. ii. Draw conclusions from individual or class data.
	f. Compare alternative explanations and predictions.	i. Rebuild and retest bridge. ii. Look for explanations that are not obvious.
	g. Communicate scientific procedures and explanations.	i. Write a proposal to a construction company describing best bridge to build. ii. Present data to the class in a meaningful way.

620. CONCEPTS OF PHYSICAL SCIENCE.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand the structure and function of matter and molecules and their interactions.	a. Explore and describe the differences among elements, compounds, and mixtures.	i. Provide samples of different elements (lead, carbon, sodium, chloride). ii. Show different types of compounds (sodium chloride, water). iii. Have students create their own mixtures.
	b. Explore and calculate properties of matter.	i. Determine the density of several objects.
	c. Compare differences among solids, liquids, and gases using the concept of density: explore the effect of temperature on density.	i. Draw three circles on a paper representing solids, liquids, and gases and place the M&Ms in the circle to represent the molecules in the three phases of matter.
	d. Understand the nature of physical change and how it relates to physical properties.	i. Perform experiments, which are examples of a physical change (melting an ice cube and then heating water to change it to steam, beating egg whites, combining salt and heated water).
02. Understand chemical reactions.	a. Observe and know that substances react with each other to form new substances with different properties.	i. Place baking soda in a plastic self-sealing bag, pour in vinegar, and seal bag. Describe new properties.
03. Understand concepts of motion and forces.	a. Observe the effects of different forces (gravity and friction) on the movement, speed, and direction of an object.	
	b. Investigate different forms of energy.	i. List and give an example of the various forms of energy. ii. Perform various experiments demonstrating the different forms of energy.

621. CELLULAR AND MOLECULAR CONCEPTS.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand the cell is the basis of form and function for all living things and how living things carry out their life functions.	a. Explore the different structural levels of which an organism is comprised: cells, tissues, organs, organ systems, and organisms.	i. Look at various types of cells under a microscope.
	b. Recognize the structural differences between plant and animal cells.	i. Create models of a plant cell and an animal cell.

	c. Explore the concept that traits are passed from parents to offspring.	i. Identify inherited traits such as rolling tongue and attached earlobe. ii. Be able to identify recessive and dominate genes using a Punnett Square (eye color, Mendel's peas).

622. INTERDEPENDENCE OR ORGANISMS AND BIOLOGICAL CHANGE.

Interdependence of Organisms and Biological Change standards do not apply at this grade level.

623. MATTER, ENERGY, AND ORGANIZATION IN LIVING SYSTEMS.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand the relationship between matter, energy, and organization to trace matter as it cycles and energy as it flows through living systems and between living systems and the environment.	a. Know that the energy for life is primarily derived from the sun through photosynthesis.	i. Discuss the food factory concept of photosynthesis.

624. EARTH AND SPACE SYSTEMS.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand scientific theories of origin and subsequent changes in the universe and earth systems.	a. Investigate the interactions between the solid earth, oceans, atmosphere, and organisms.	i. Plate tectonics and continental drift. ii. Oceans affect climate. iii. Global warming. iv. Weather.
	b. Know the water cycle and its relationship to weather and climate.	
	c. Identify cumulus, cirrus, and stratus clouds and their relationship to weather changes.	
	d. Know that fossils are evidence of past life forms.	
02. Understand geo-chemical cycles and energy in the earth system.	a. Know the rock cycle and identify the three classifications of rocks.	i. Draw a poster that illustrates the rock cycle. ii. Given a box of rocks, identify which are igneous, metamorphic, and sedimentary.
	b. Know the layers and composition of the earth.	i. Create the layers of the earth inside a bowl with different flavors of ice cream discussing the layers as they are formed. ii. Unmold on a tray and create the continents with chocolate syrup. Eat and enjoy.

625. TECHNOLOGY.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand the relationship between science and technology and develop the abilities of technological design and application.	a. Know that science and technology are human endeavors interrelated to each other, to society, and to the work place.	i. Discuss the concept that science is man's effort to understand his world. Technology assists man in this undertaking.
	b. Compare scientific inquiry and technological design in terms of activities, results, and influences on individuals and society: know that science enables technology and vice versa.	i. Discuss the inventions that resulted from the space program. ii. Participate in "Invention Convention."
	c. Create a tool to perform a specific function.	
	d. Use available and appropriate technology.	
	e. Explore the elements of technological design, which include the following: - Identify a problem; - Propose a solution; - Implement a proposed solution; - Evaluate the solution and its consequences; - Communicate the problem, process, and solution.	i. Graph results of a scientific experiment using a calculator or computer.

626. PERSONAL AND SOCIAL PERSPECTIVES.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand common environmental quality issues, both natural and human induced.	a. Identify issues for environmental studies.	i. Compile a case study of a local environmental issue and describe its impact on Idaho's economy.
02. Understand the causes and effects of population change.	a. Understand the effect of technological development and human population growth on the United States and/or the world.	i. Take a field trip to the local sewage treatment center or water treatment plant. ii. Clean up the schoolyard, park, or waterway. iii. Compare and contrast differences that countries face around the world.
03. Understand the importance of natural resources and the need to manage and conserve them.	a. Understand tle differences between renewable and nonrenewable resources.	i. Collect trash and divide into renewable and nonrenewable resources.
	b. Understand the conservation of natural resources.	i. Research and debate the various viewpoints surrounding the Snake River dams in Idaho.

04. Understand different uses of technology in science and how they affect our standard of living.	a. Identify examples of technologies used in these scientific fields: - Food production; - Environmental cleanup; - Advances in medicine; - Communications; - The space program; - Weather forecasting.	i. Take field trips to various sites. ii. Research using the Internet.

627. HISTORY OF SCIENCE.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand the significance of major scientific milestones.	a. Understand major contributions of various scientists and researchers.	i. Choose a scientist from a topic studied this year and explain how their contribution was significant to society.

628. INTERDISCIPLINARY CONCEPTS.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand that interpersonal relationships are important in scientific endeavors.	a. Work in teams to solve problems.	i. Find a community problem to work on as a class. ii. Work in teams of three or four to complete assigned labs.
02. Understand technical communication.	a. Read, understand, and follow technical instructions.	i. Build a model using the technical instructions.
	b. Write a lab report.	i. Write instructions for a lab procedure to be followed by another student who may have been absent.